PUBLISHED DOCUMENT

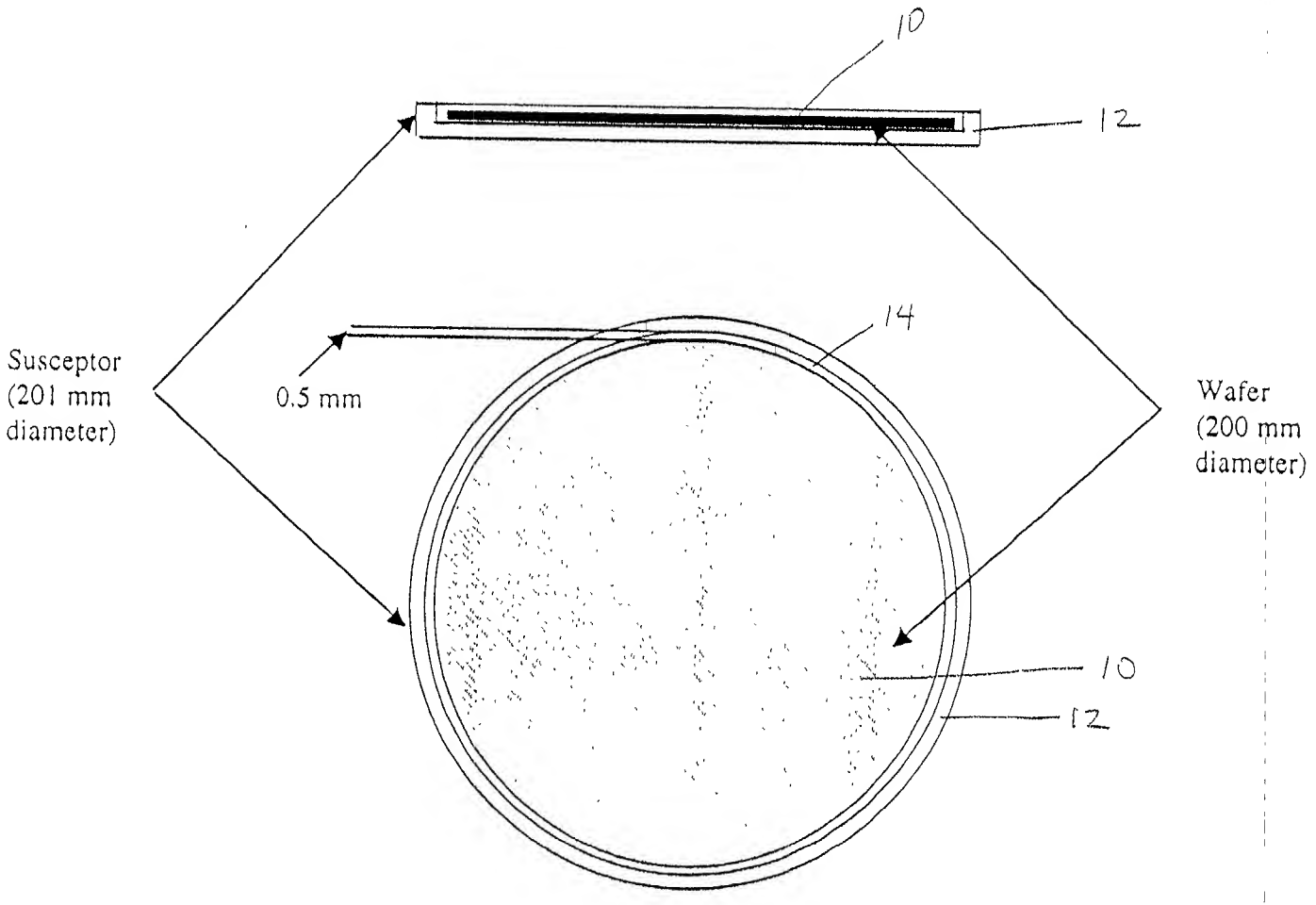

Fig. 1

FOREIGN PUBLICATION

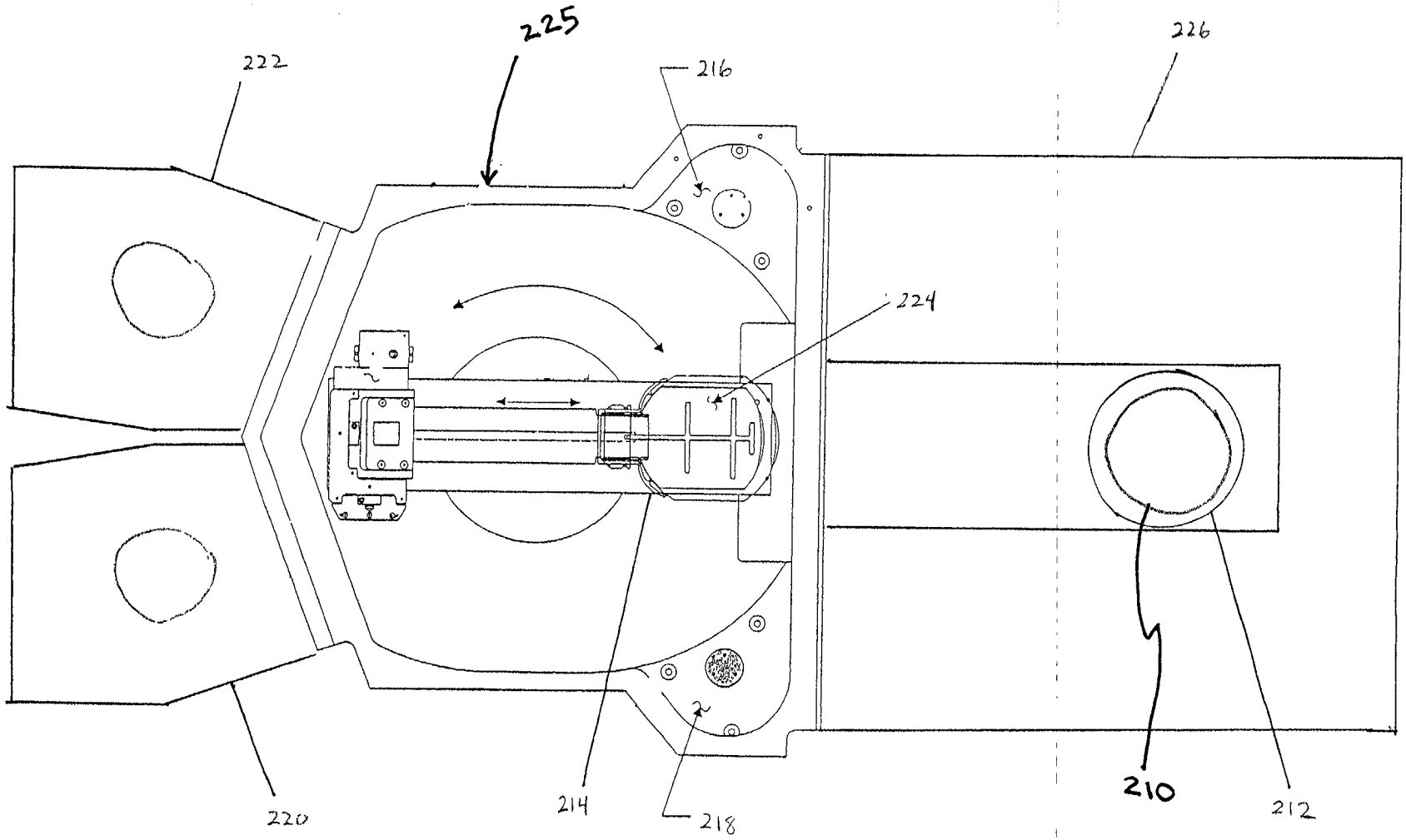

FIG. 2A

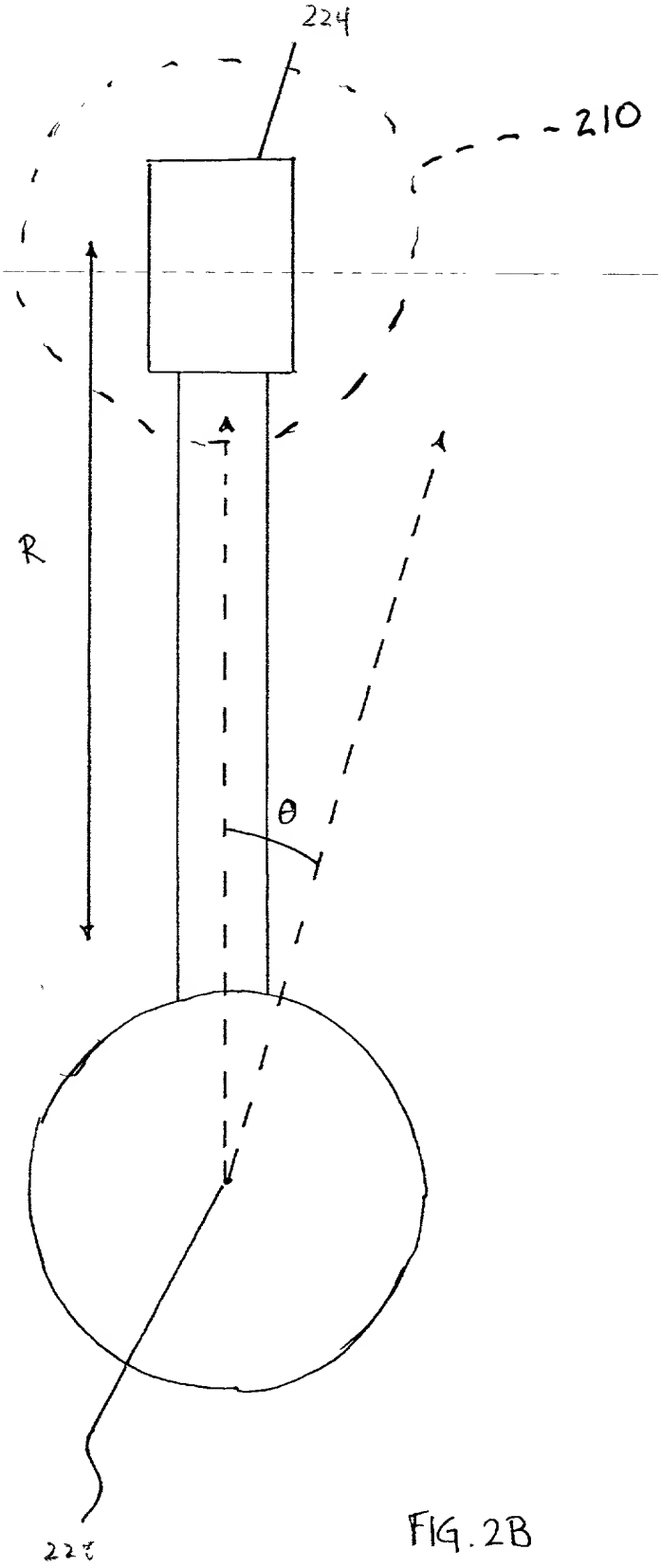

FIG. 2B

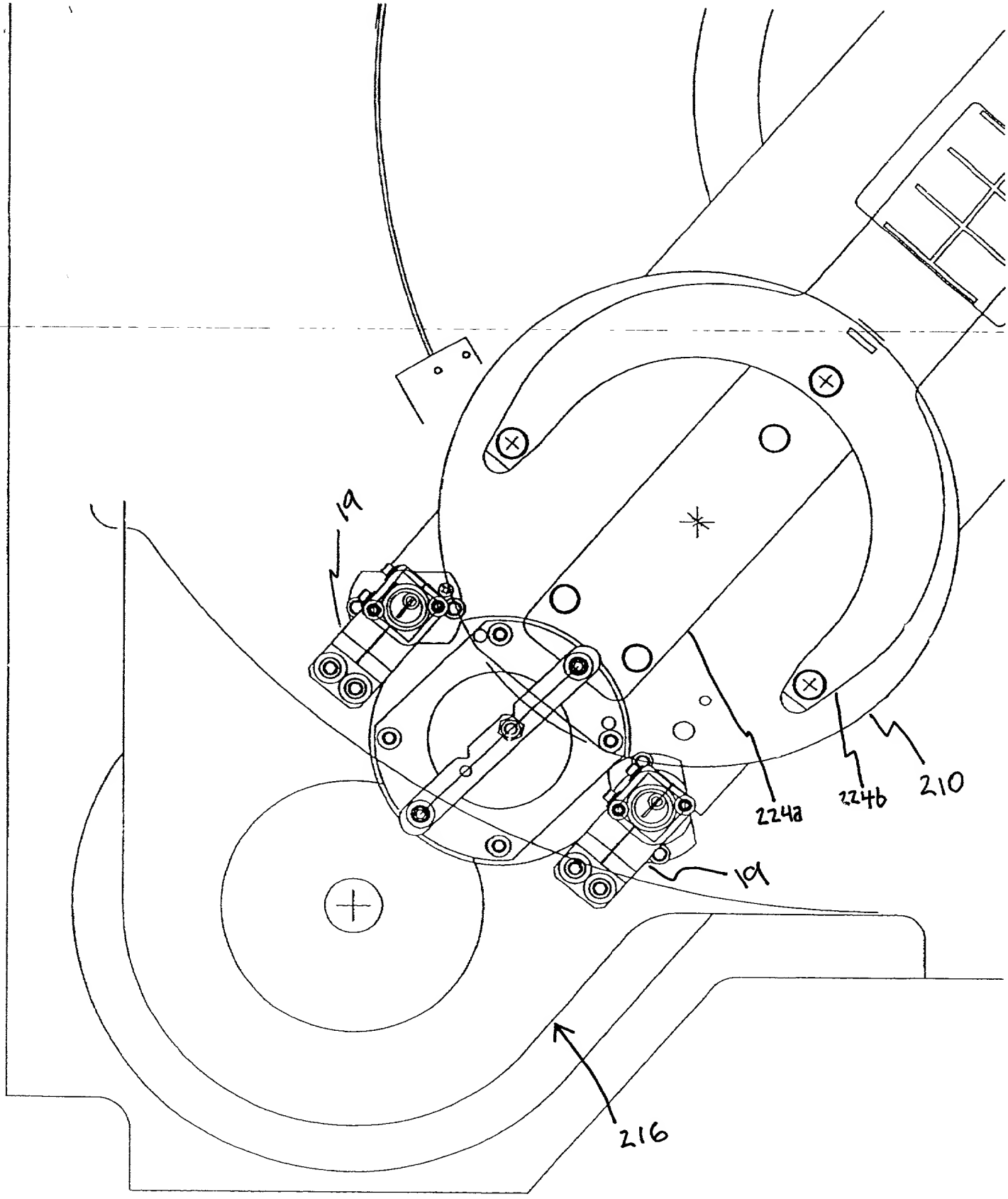

FIG. 2C

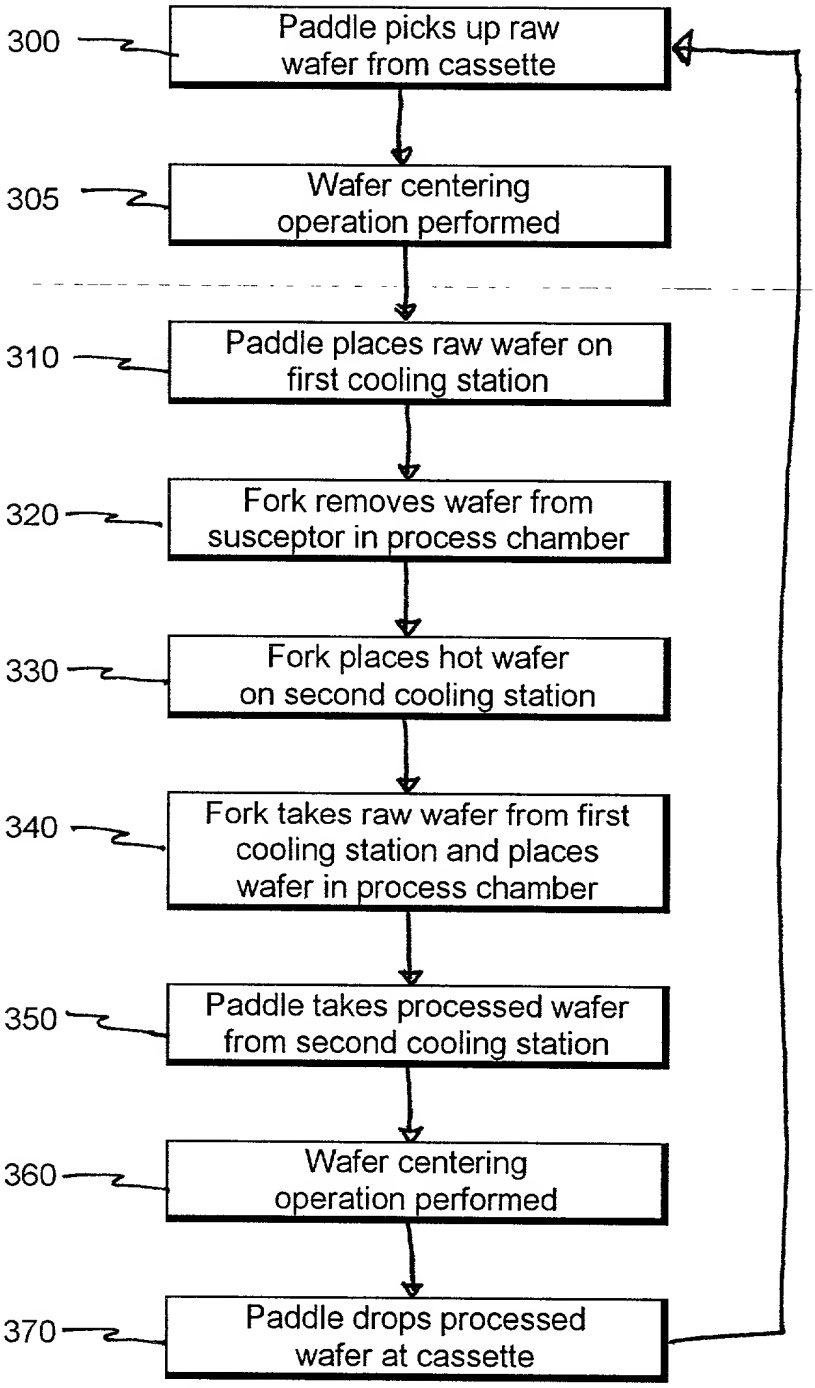
300
Paddle picks up raw wafer from cassette
305
Wafer centering operation performed
310
Paddle places raw wafer on first cooling station
320
Fork removes wafer from susceptor in process chamber
330
Fork places hot wafer on second cooling station
340
Fork takes raw wafer from first cooling station and places wafer in process chamber
350
Paddle takes processed wafer from second cooling station
360
Wafer centering operation performed
370
Paddle drops processed wafer at cassette

FIG. 3

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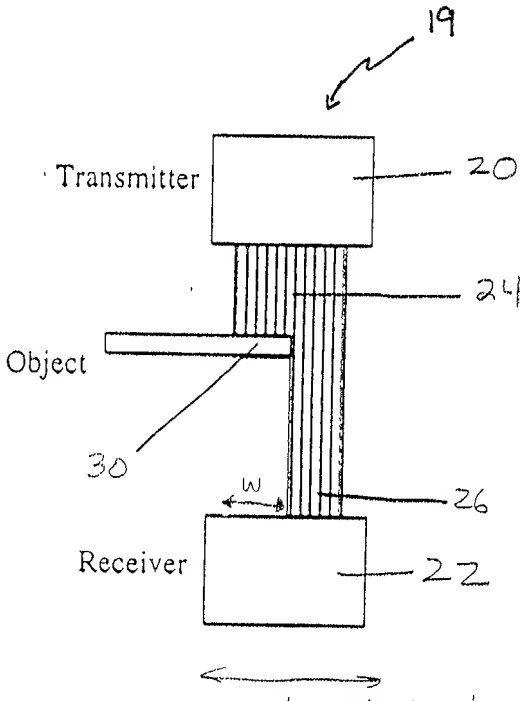

Fig 4

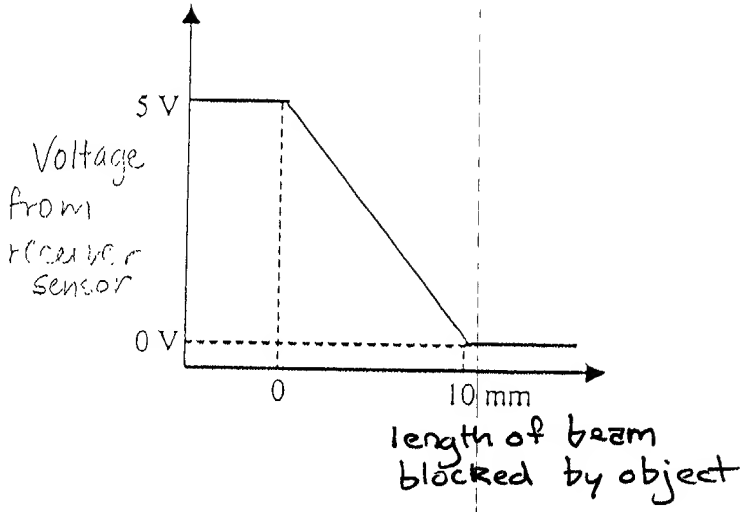

Fig 5

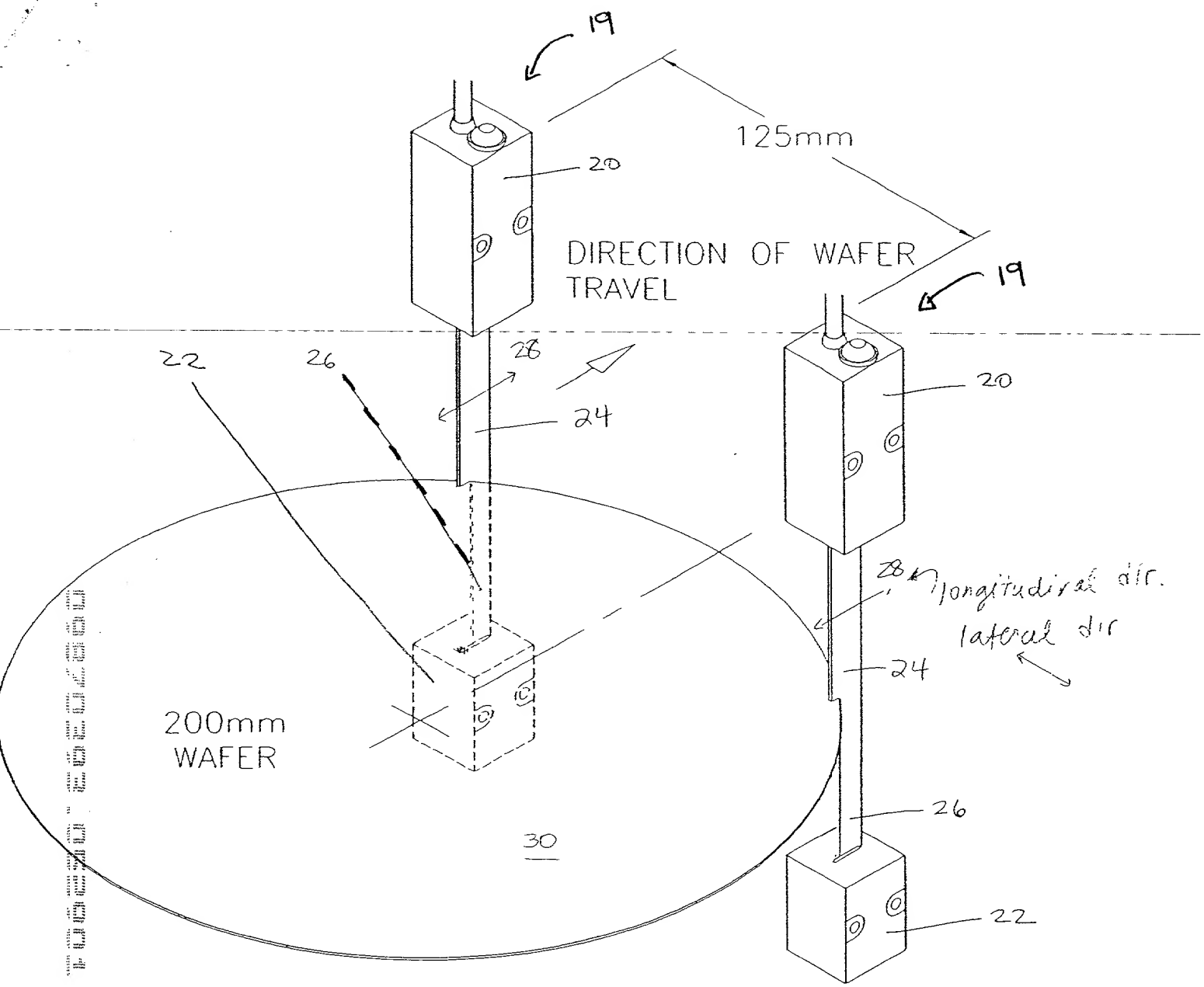
19
125mm
20
DIRECTION OF WAFER TRAVEL
19
22
26
28
24
20
28
longitudinal dir.
lateral dir
24
200mm WAFER
26
30
22

Fig. 6

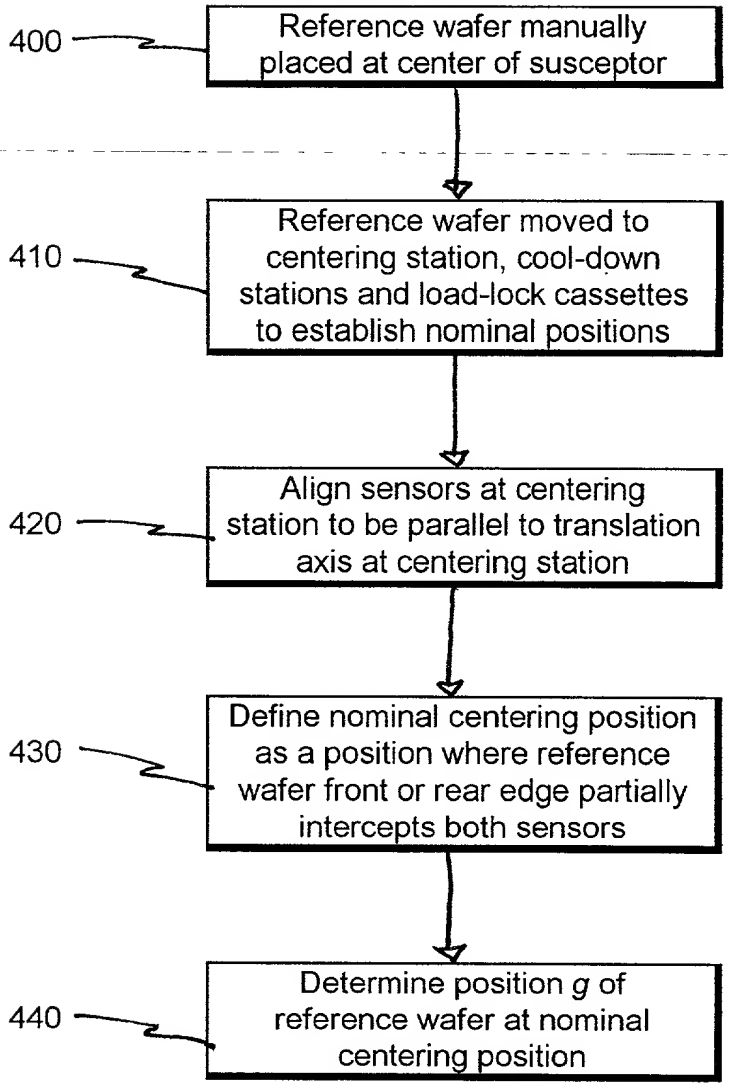
400
Reference wafer manually placed at center of susceptor
410
Reference wafer moved to centering station, cool-down stations and load-lock cassettes to establish nominal positions
420
Align sensors at centering station to be parallel to translation axis at centering station
430
Define nominal centering position as a position where reference wafer front or rear edge partially intercepts both sensors
440
Determine position g of reference wafer at nominal centering position

FIG. 7

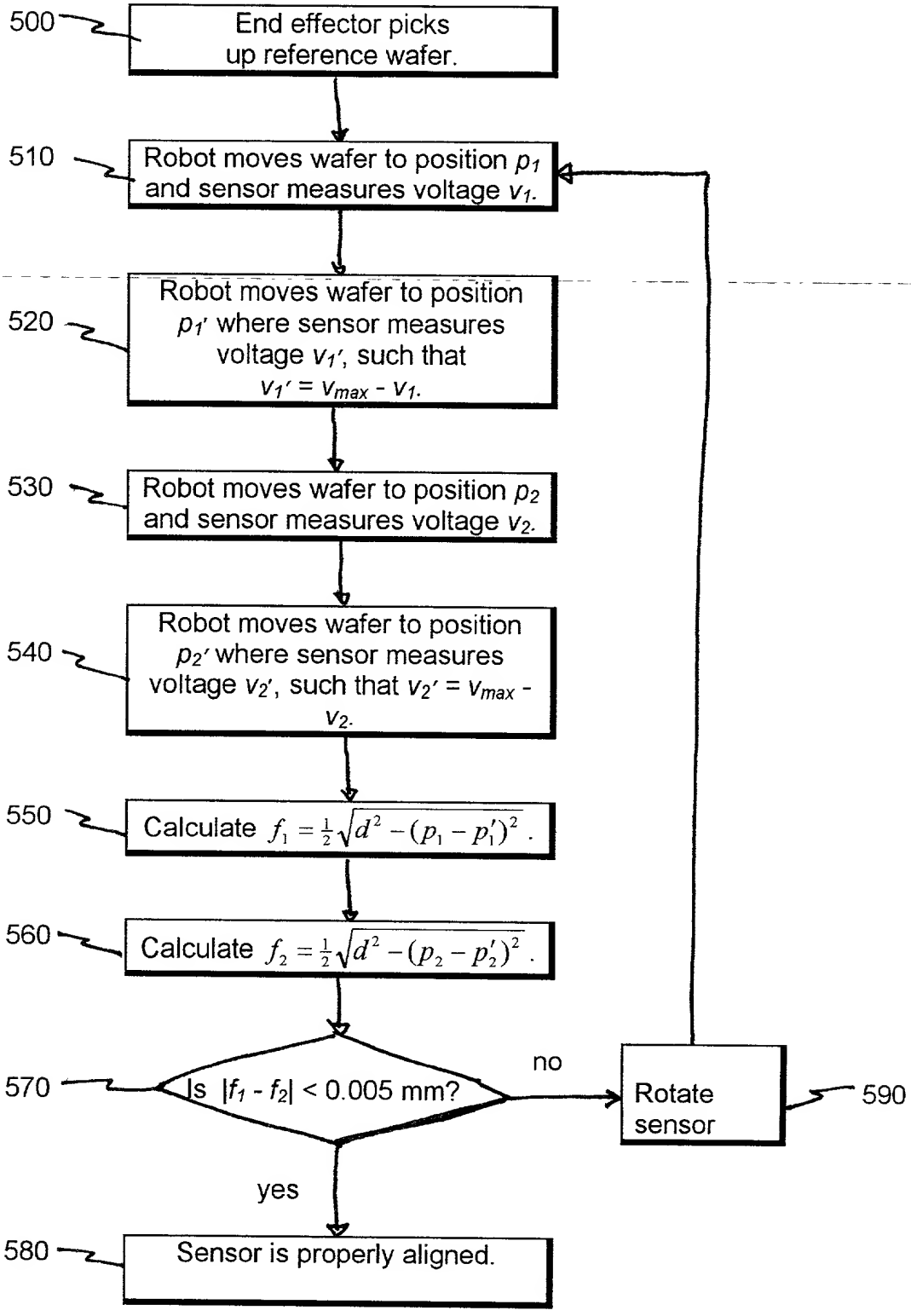
500
End effector picks up reference wafer.
510
Robot moves wafer to position p_1 and sensor measures voltage v_1.
520
Robot moves wafer to position p_1' where sensor measures voltage v_1', such that $v_1' = v_{max} - v_1$.
530
Robot moves wafer to position p_2 and sensor measures voltage v_2.
540
Robot moves wafer to position p_2' where sensor measures voltage v_2', such that $v_2' = v_{max} - v_2$.
550
Calculate $f_1 = \frac{1}{2}\sqrt{d^2 - (p_1 - p_1')^2}$.
560
Calculate $f_2 = \frac{1}{2}\sqrt{d^2 - (p_2 - p_2')^2}$.
570
Is $|f_1 - f_2| < 0.005$ mm?
no
Rotate sensor
590
yes
580
Sensor is properly aligned.

FIG. 8

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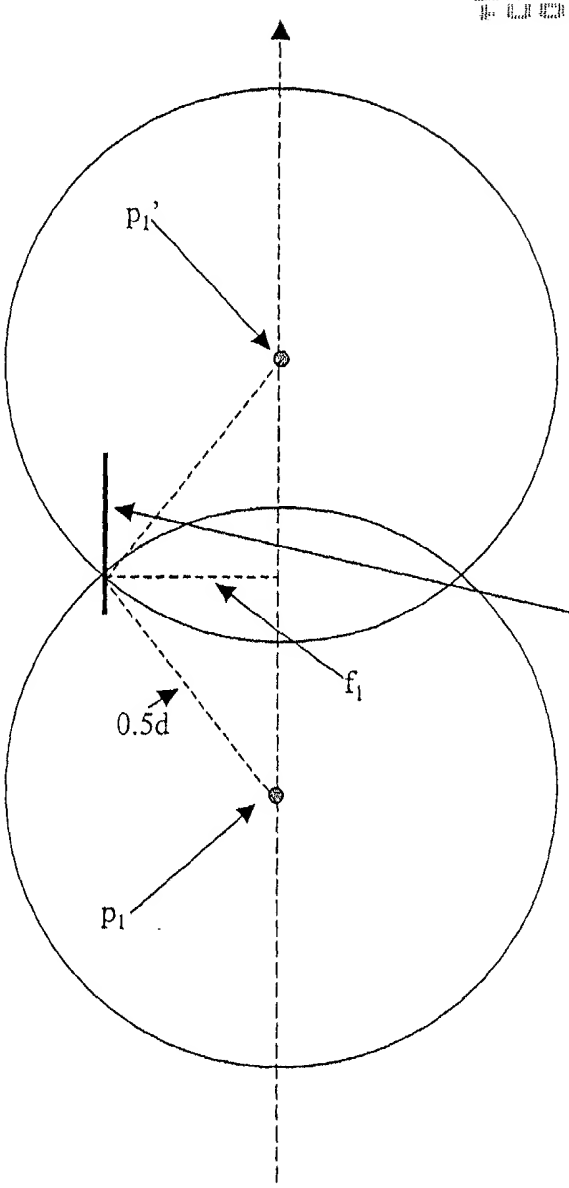

FIG. 9

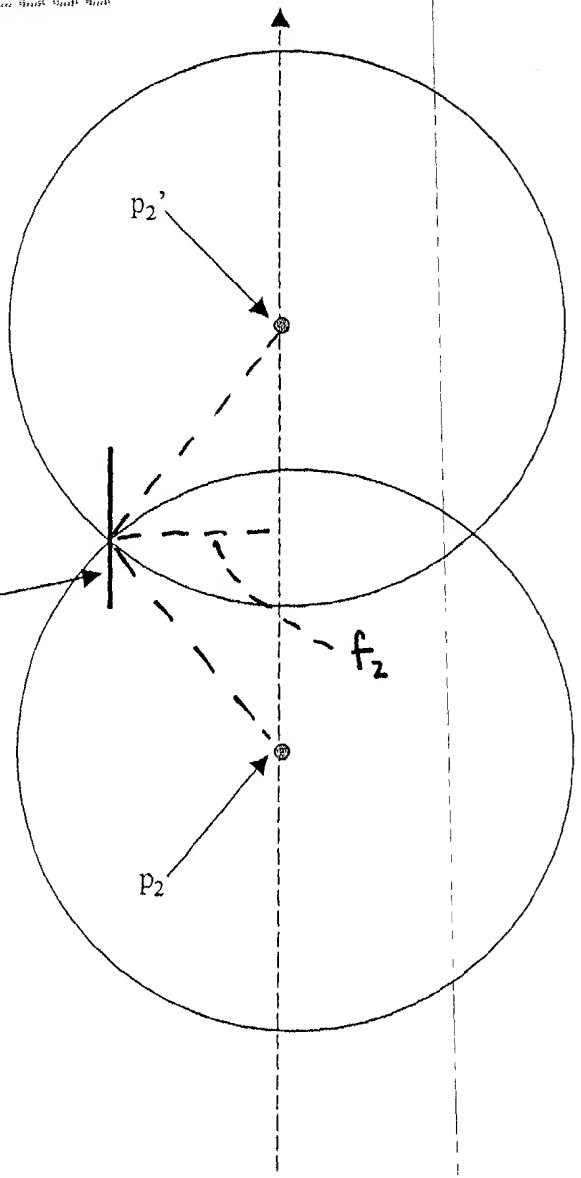

FIG. 10

Laser Through
Beam Sensor

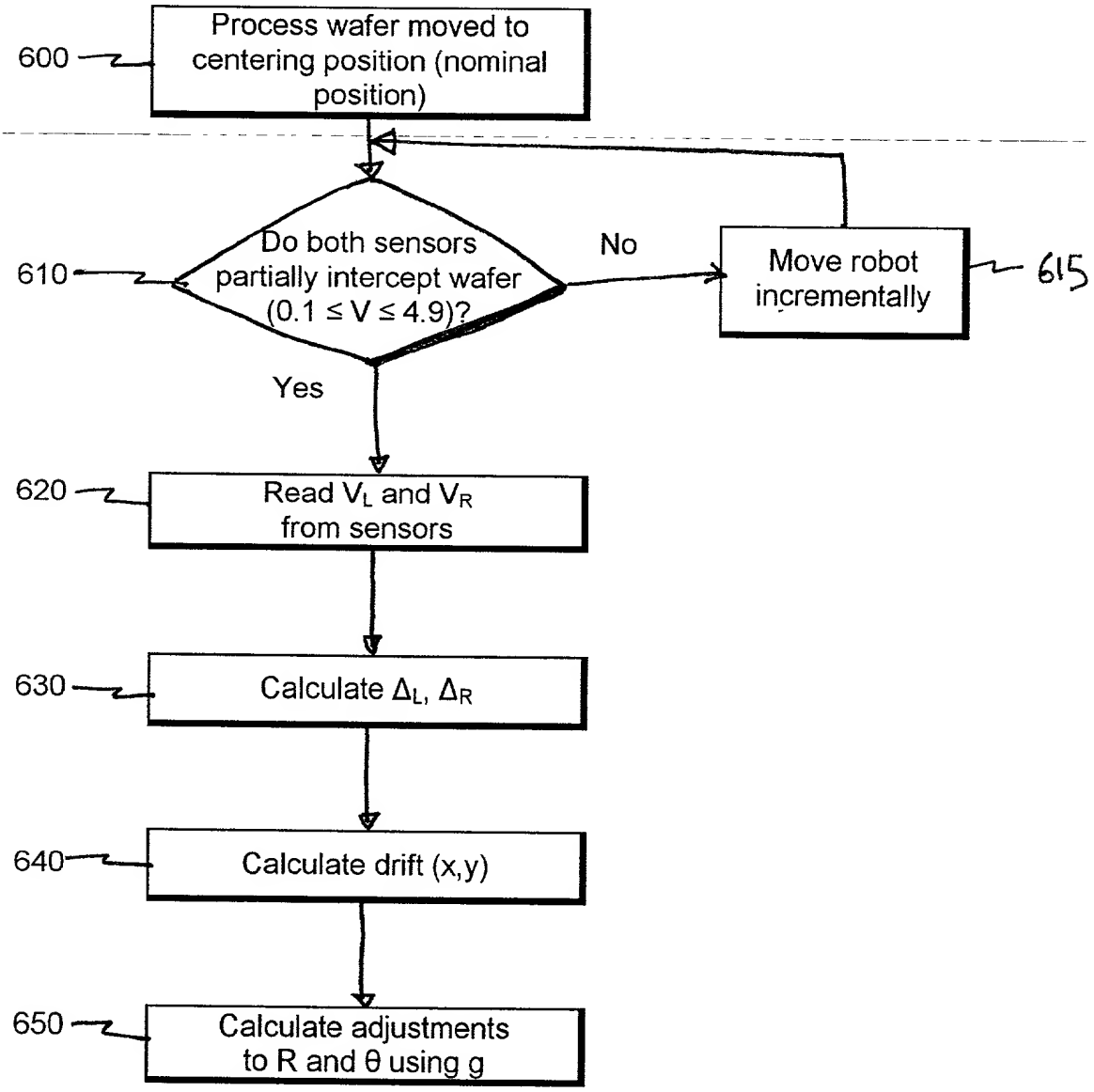
600
Process wafer moved to centering position (nominal position)
610
Do both sensors partially intercept wafer (0.1 ≤ V ≤ 4.9)?
No
Move robot incrementally
615
Yes
620
Read V_L and V_R from sensors
630
Calculate Δ_L, Δ_R
640
Calculate drift (x,y)
650
Calculate adjustments to R and θ using g

FIG. 11

Wafer Position/Error Calculation

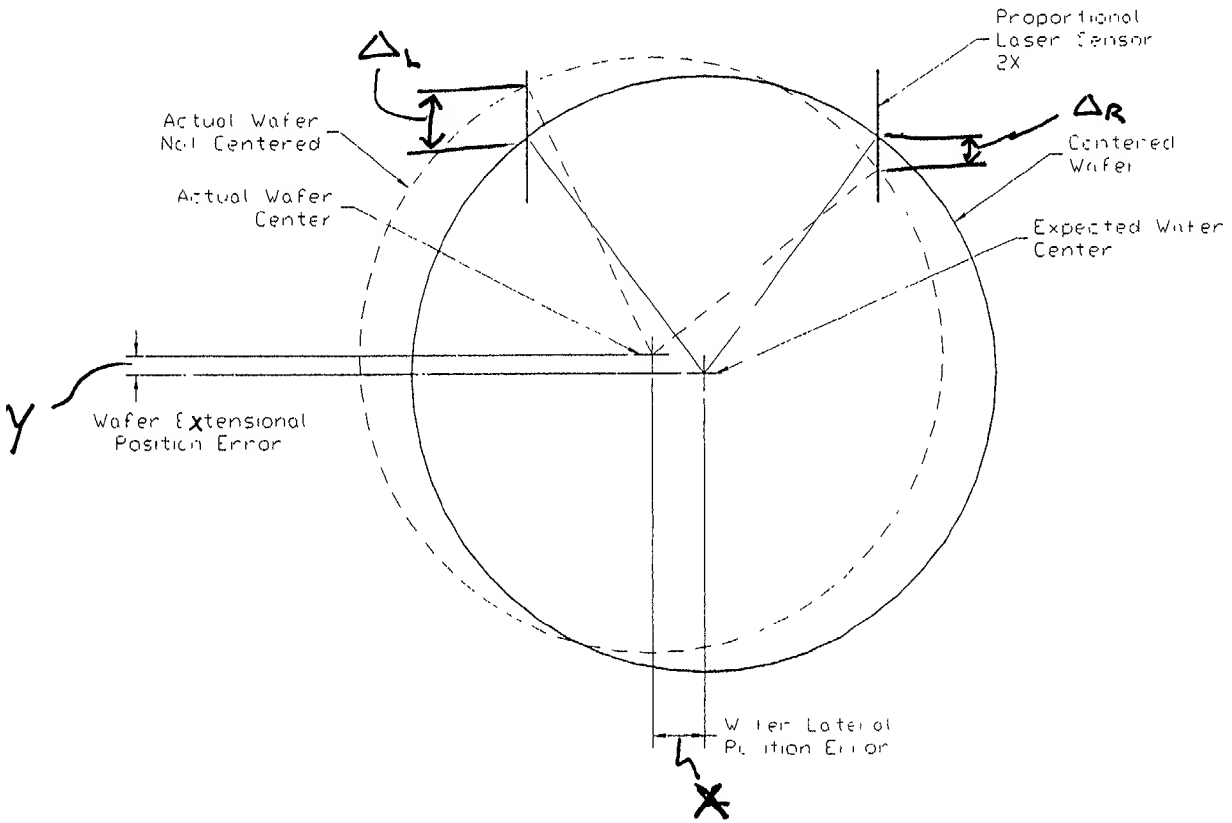

FIG. 12